

Calgary

Arjun Nair, 16

Grade 11, Webber Academy, Calgary

Aiming to create an effective cancer-killing nano-bullet made of gold

Helping science develop a nano-bullet to defeat cancer is the futuristic vision of Arjun Nair, a 16-year-old Calgary high school student and top prize winner in the 20th Alberta regional “Sanofi BioGENEius Challenge Canada (SBCC)”.

These “bullets” are formed by gold nanoparticles that, when injected into a patient, accumulate in cancerous tumours. When bathed in laser light, the gold nanoparticles rapidly heat up in the tumours, killing only the cancer cells. Known as photothermal therapy (PTT), the idea has shown great promise.

Unfortunately, PPT isn't that effective because cancer cells fight back, producing heat-shock proteins to protect themselves. Arjun, a Grade 11 student at Calgary's Webber Academy has found a possible way to stop this using an antibiotic (17-AAG).

Nanoparticles are less than millionth of the size of grain of sand, making them pretty difficult to make and work with, says Arjun. He spent the last two years working on his idea, including the past year between Simon Trudel's and David Cramb's Nanoscience Labs at the University of Calgary.

It's rare for a high-tech lab to allow a high school student to work with its expensive equipment but Dr. Cramb, Dr. Simon Trudel and Lab Manager, Amy Tekrony provided access and all important mentorship, he says.

“Proof-of-concepts were developed and tested in order to demonstrate the viability of PTT,” says Arjun. “Moreover, after analyzing the literature a mathematical model was developed to evaluate a theoretical synergetic treatment.”

“I've entered science competitions since Grade 5. I really enjoy taking my ideas and making them

happen in real life,” says Arjun, who also enjoys debating, sports and volunteer work.

He dreams of doing science in university, perhaps pursuing a career in medical research. One of the best parts of the competition was the great friendships Arjun has made. “I’m part of community of students who love sharing ideas and talking science.”